

The U.S. Climate Change Science Program's Strategic Plan for Global Change and Climate Change Studies



Richard H. Moss

Climate Change Science Program
Office



This Presentation

- Program update
- Strategic plan: process and overview
- CCSP Workshop



Update

- CCSP, incorporating USGCRP and CCRI
 - Joint membership with SGCR
 - <http://www.usgcrp.gov/>
- New CCSP Office: 1717 PA Ave NW
 - Incorporates program offices for USGCRP, CCRI, CLIVAR, carbon cycle, and water cycle
- Program planning process
 - Interagency process for CCRI FY04
 - Extension to CCRI and USGCRP FY05
- *Our Changing Planet* FY03



Strategic Plan Process

- CCSP oversight
- Builds on USGCRP strategic plan
- Interagency working group participation
- External research community involvement through NRC and other reports & CCSP workshop and review process
- Iterative process—this version a DRAFT



Format

- High-level vision statement, not an implementation plan
- 170 pages
- Question format
- www.climate-science.gov
- “White papers”



Overview of the Strategic Plan

- CCSP Mission and Principles
- Part I: CCRI
- Part II: USGCRP
- Part III: Communications, International Cooperation, and Management



CCSP Mission

- Provide science-based information required to inform public debate on climate and global change issues as required for effective public policy and stewardship of natural resources



Example Issues for Science and Society

- Detection? Historical perspectives?
- Attribution? Future interactions of human-induced and natural forces?
- Future Earth system response to natural and human-induced forces?
- Sensitivity of natural and managed ecosystems? Future responses, given multiple factors?
- Projected effects (climatic, environmental, and socio-economic) of risk management strategies?



CCSP Guiding Principles

- The scientific analyses conducted by the CCSP are policy relevant but not policy driven
- CCSP analyses should specifically evaluate and report uncertainty
- CCSP analyses, measurements, projections and interpretations should meet two standards:
 - Scientific credibility
 - Lucid public communication



CCSP to provide direction to both CCRI and USGCRP

- CCRI is where we are practical and focused
 - Information to support decisionmaking on climate change
- The GCRP has a decadal view, breadth, and openness to surprises



Part I: CCRI

- Research Focused on Key Climate Change Uncertainties
- Climate Quality Observations, Monitoring, and Data Management
- Decision Support Resources



CCRI (1) Research Focused on Key Climate Change Uncertainties

- What aerosols are contributing factors to climate change and what are their relative contributions?
- What are the magnitudes and distributions of North American carbon sources and sinks, and what are the processes controlling their dynamics?
- How much of expected climate change is the consequence of feedback processes? (Clouds and water vapor feedbacks? Polar regions?)



CCRI (2) Climate Quality Observations, Monitoring, and Data Management

- How did the global climate change over the past fifty years and beyond, and how well do we understand both the natural and anthropogenically forced variations?
- What is the current state of the climate, how does it compare with the past, and what does it tell us about the future?
- How do we resolve the differences in surface and tropospheric temperature trends?
- How are biological and ecological systems responding to climate change?
- How accessible is the climate record?



CCRI (3) Decision Support Resources

- Evaluations and synthesis for national policy analysis and regional resource management?
- Scenario development
- Applied climate modeling
- Resources for risk analysis and decision making under uncertainty



Part II: USGCRP

- Atmospheric Composition
- Climate Variability and Change
- Water Cycle
- Land Use/Land Cover Change
- Carbon Cycle
- Ecosystems
- Human Contributions and Responses to Environmental Change
- Grand Challenges in Modeling, Observations, and Information Systems



Template for Part II Elements

- Introduction: Overview
- Question 1
 - State of knowledge
 - Illustrative 2nd tier research questions
 - Research needs
 - Products and payoffs
- Question 2 ...
- Linkages



Management

- CCSP is linked directly to the EOP
- CCSP Responsibilities
 - Oversee interagency working groups
 - Interact with external advisory groups
 - Budget review and balance
- Mechanisms
 - Scientific guidance
 - Interagency planning and implementation
 - Program integration

CCSP Workshop for Scientists and Stakeholders



- Washington, D.C., on 3-5 December 2002.
- "Jump start" a comprehensive review of the updated research and reporting plans for US global change research
- Focus on key unresolved scientific issues, climate and ecosystem monitoring systems, and decision support resources
- "Information gathering" for further program development
- <http://www.climatescience.gov/>



Atmospheric Composition Observations Priorities

- Continue global observation of ozone distribution and trends, and a representative sample of source, reservoir, and tracer molecules that govern stratospheric chemistry.
- Develop and implement global observations of aerosol distribution and properties.
- Improve surface-, aircraft-, and space-based measurements of global and regional troposphere pollutants, and atmospheric chemistry.



Climate Variability and Change Obs. Priorities

- Maintain and improve long-term space-based and in situ observations of temperature, humidity, wind strength and direction, clouds, precipitation, pressure, sea ice, snow cover, glaciers, and ice sheets.
- Develop and maintain an Integrated Ocean Observing System, combining in situ and satellite observations, to monitor ocean topography and circulation, heat content, salinity, sea level, and ocean-atmosphere exchange of momentum, heat, and freshwater.
- Maintain and improve space-based and in situ measurements of key climate forcings (greenhouse gases, aerosols, solar radiation, and land cover change)



Water Cycle Observation Priorities

- Develop and maintain the continuity and consistency of climate-quality observations of atmospheric temperature, water vapor, and clouds.
- Develop and implement space-based global measurements of precipitation, continental soil moisture, soil freezing/thawing, and snow accumulation.
- Maintain and expand surface-based operational measurements of hydrologic variables.
- Develop and implement systematic regional hydrologic, climate, and radiation measurement test beds, and advanced technologies involving ground based remote sensing and water isotope analysis.



Land Use and Land Cover Change Obs. Priorities

- Maintain high-resolution observations of rapid changes in global land cover and land use.
- Maintain the research quality of long-term, global observations of land cover and land use at low and moderate resolution through the transition to operational observing systems.
- Develop *in situ* ecosystem observations and the collection of relevant local and regional socioeconomic data.
- Improve links between ground-based and remote-sensing land use and land management data systems.



Carbon Cycle Observations Priorities

- Strengthen and ensure the continuity of continental inventories of forests, other ecosystems, and major land uses, and derived estimates of soil carbon storage.
- Continue and enhance a national carbon dioxide (CO₂) flux measurement network that covers all major ecosystem types, and promote the development of a worldwide network of cooperating sites.
- Strengthen and ensure the continuity of global oceanic chlorophyll observations, and derived estimates of oceanic primary productivity and carbon budget.
- Strengthen and ensure the continuity of surface-based measurement of ocean carbon and air-sea carbon flux.



Ecosystems Observations Priorities

- Expand age, size, and vertical structure measurements of forests with known management histories.
- Develop satellite remote sensing capabilities to determine terrestrial ecosystem productivity.
- Increase collection of ground truth data at Long Term Ecological Research and similar sites in all major natural and managed ecosystem types.